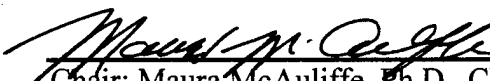
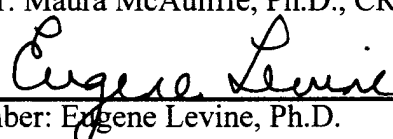
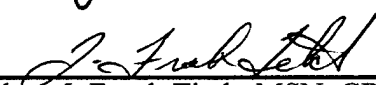


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PREANESTHETIC ASSESSMENT OF HERBAL AND DIETARY SUPPLEMENT
USE

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ABSTRACT

The use of unregulated *herbal* and *dietary supplements* in the United States is steadily increasing, and *anesthesia* providers are becoming increasingly concerned about the potential for adverse drug *reactions*. *Anesthesia* providers' knowledge regarding the use of *supplements* and their potential *interaction* with anesthetics is largely unreported in the literature. This descriptive, two-phased study examined current practice of United States Air Force (USAF) Certified Registered Nurse Anesthetists (CRNA) regarding *herbal* and *dietary supplements* in the *preanesthetic* medication *assessment* and the use of *herbal* and *dietary supplements* by patients undergoing *anesthesia* in a USAF medical center. In phase-I, a convenience sample of 220 USAF CRNAs was surveyed using a seven-item questionnaire. Of 126 USAF CRNA respondents, 58% reported asking their patients about *supplement* use. Eighty-five percent of all respondents reported that this issue is an important part of the *preanesthetic assessment*. Fifty-three percent of respondents commonly recommend discontinuing *supplement* use at least 48 hours prior to surgery, while 47% of respondents do not make recommendations. Twelve percent of respondents reported that they have suspected an *anesthesia-supplement reaction*, most commonly, coagulation problems or sympathetic nervous system alterations. In phase-II of the study, 86 patients presenting to the *preanesthetic* clinic at an USAF medical center were asked about *herbal* and *dietary supplement* use. Twelve percent reported taking *herbal supplements* and 24% reported *dietary supplement* use.

Key Words: **anesthesia**, **dietary supplement**, **herbal supplement**, **interaction**, **preanesthetic assessment**, **reaction**

PREANESTHETIC ASSESSMENT OF HERBAL
AND DIETARY SUPPLEMENT USE

by

PAUL MICHAEL EFFERTZ, BSN, BA

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TABLE OF CONTENTS

ACKNOWLEDGEMENTS	vii
LIST OF TABLES	x
LIST OF FIGURES	xi
CHAPTER I: INTRODUCTION.....	1
Background.....	1
Purpose Statement	2
Research Questions.....	2
Theoretical Framework.....	3
Definitions: Conceptual and Operational	6
Assumptions	7
Limitations.....	8
Summary	8
CHAPTER II: REVIEW OF LITERATURE	9
Introduction	9
Herbal and Dietary Supplement Utilization	9
Herbal and Dietary Supplement Interactions.....	12
Preanesthetic Medication Assessment.....	16
Summary.....	17
CHAPTER III: METHODS	18
Introduction	18
Research Design	18
Sample	18

Protection of Human Rights	19
Plan for Data Analysis.....	19
Summary.....	20
CHAPTER IV: ANALYSIS OF DATA	21
Introduction	21
Phase-I Data Analysis.....	21
Phase-II Data Analysis	32
Summary.....	34
CHAPTER V: SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS	35
Introduction	35
Conclusions	35
Recommendations	37
Summary.....	38
REFERENCES	39
APPENDICES	43

LIST OF TABLES

Table 1. Survey Question 5: In What Size Facility Do You Currently Practice?.....	23
Table 2. Survey Question 6: How Many Anesthetics Do You Administer Monthly?....	23
Table 3. Survey Question 7: How Long Have You Been a CRNA?	23
Table 4. Survey Question 1: Do You Ask Patients About Herbal and Dietary Supplement Use in the Preanesthetic Assessment?	25
Table 5. Survey Question 2: Do You Think It Is Important To Ask Patients About Herbal and Dietary Supplement Use in the Preanesthetic Assessment?.....	27
Table 6. Survey Question 3: Do You Have Recommendations to Patients Reporting Herbal and Dietary Supplement Use in the Preanesthetic Assessment?.....	29
Table 7. Survey Question 4: Have You Ever Suspected an Anesthetic-Supplement Reaction?	31
Table 8. Preanesthetic Assessment of Reported Herbal and Dietary Supplement Use ..	33

LIST OF FIGURES

Figure 1. Graphic Depiction of Wiedenbach's (1964) Prescriptive Theory of Clinical Nursing Applied to Nurse Anesthesia.....	5
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CHAPTER I: INTRODUCTION

Background

In this chapter, a description of potential anesthesia implications of herbal and/or dietary supplement utilization by patients will be presented. Herbal and dietary supplement use in the United States (U.S.) is increasing, and the potential risk of anesthesia interactions may also be increasing. In this chapter, the importance of anesthesia providers asking patients about their use of these supplements in preanesthesia assessments, and recommendations about their use preoperatively will be explained. Wiedenbach's (1964) prescriptive theory of nursing as a conceptual model guiding this research will be described, and assumptions and limitations will be presented.

All patients scheduled for anesthetics should have a preoperative history and physical examination as well as a preanesthetic visit. The purpose of the preanesthetic visit is to ensure that patients are in optimal condition to receive anesthetics, to determine an anesthetic plan of care, and to obtain informed consent.

Identifying prescription and over-the-counter medication use is an important aspect of the preanesthetic visit. Most anesthesia providers inquire about patients' prescription-drug utilization. The percentage of providers that ask about use of herbal and dietary supplements is unknown. Today as many as 93% of Americans report taking herbal and/or dietary supplements (Winslow & Kroll, 1998). Stores that sell only herbal and dietary supplements have opened throughout the country, as well as on many U.S. military installations. Herbal sales in the U.S. increased nearly 60% in 1997 (Miller, 1998). According to the U.S. Food and Drug Administration, \$6.5 billion were spent on

dietary supplements in the U.S. in 1996 (Kurtzweil, 1998).

Patients taking herbal supplements have experienced serious and potentially fatal side effects (Okie, 1998). Miller (1998) reported that drug-herb interactions are poorly monitored and may not be acknowledged by health care providers. There may even be cause for concern with respect to herbal-anesthetic drug interactions. This is a new area of inquiry as there is a lack of knowledge about herbal and/or dietary supplement use by patients undergoing anesthesia in military hospitals.

Purpose Statement

The purpose of this study was to describe patient use of herbal and/or dietary supplements during the preoperative medication assessment conducted by United States Air Force (USAF) Certified Registered Nurse Anesthetists (CRNAs). A description of current practice of USAF CRNAs with respect to patient use of these supplements, including any preanesthetic recommendations, was made.

Research Questions

1. Do USAF CRNAs ask patients about herbal and/or dietary supplement usage in the preanesthetic medication assessment?
2. Do USAF CRNAs think it is necessary to include herbal and/or dietary supplements in preanesthetic medication assessments?
3. If patients report taking herbal and/or dietary supplements, what recommendations, if any, do USAF CRNAs make regarding those supplements?
4. What herbal and/or dietary supplement utilization are patients reporting in preanesthetic medication assessments?

Theoretical Framework

Ernestine Wiedenbach's (1964) situation-producing, prescriptive theory describes the action-oriented profession of nursing. As a practicing nurse midwife and educator, she developed this theory for application to clinical nursing. In her view, nursing theory "...is born in practice, refined in research, and must and can return to practice" (Dickoff, James, & Wiedenbach, 1968, p. 415). She believed theory should systematically explain what nurses do in the process of nursing. She developed a theory that synthesizes the actions, or prescriptions, nurses make in the process of providing nursing care. This prescriptive theory has application for the clinical practice of nurse anesthesia.

Wiedenbach (1964) describes four essential elements of clinical nursing; philosophy, purpose, practice, and art. Wiedenbach believes the philosophy of nursing is comprised of a shared reverence for life, a common respect for the human being, and a universal need to act in response to one's beliefs. The purpose of clinical nursing is to meet the need patients perceive as a need for help. Clinical practice focuses on identification of patients' needs for help, nurses' ministrations of the needed help, and validation that the help given meets patients' needs (Nickel, Gesse, & MacLaren, 1992). The art of nursing consists of actions nurses take through knowledge, judgement, and skill to meet patients' needs for help. These actions are based on nurses' perceptions of their overall purpose and role with respect to patients (Wiedenbach, 1964).

Identifying patients' needs for help is the first step in this prescriptive theory of nursing. A need for help is defined as any measure or action required and desired by the individual which has the potential for restoring or extending the ability to cope with the

demands implicit in a situation. CRNAs use preanesthetic visits to identify patients' unique needs for help, and any behaviors that may assist or hinder their abilities to resolve those needs. This is graphically depicted in Figure 1.

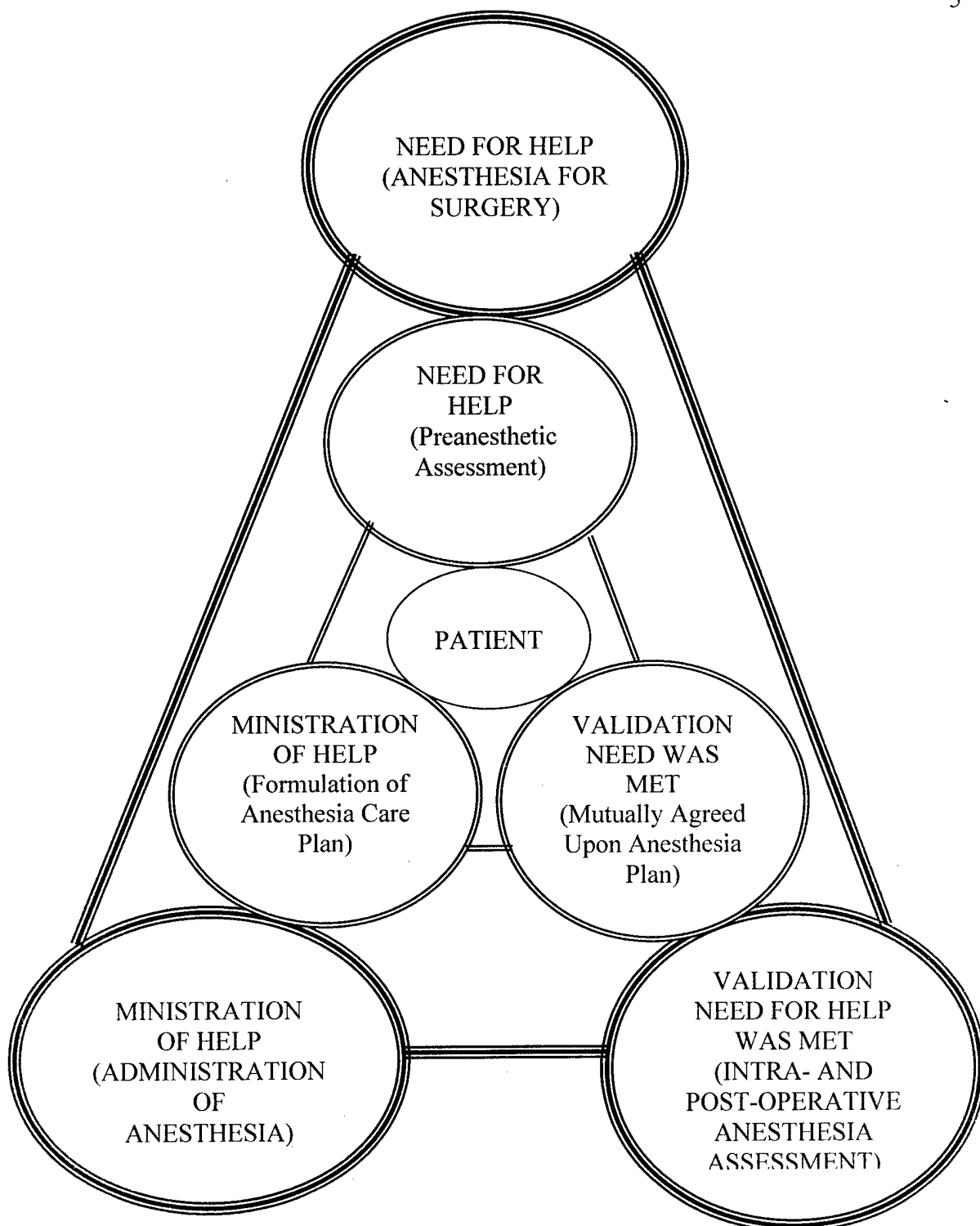


Figure 1.

**Graphic Depiction of Wiedenbach's (1964) Prescriptive Theory of Clinical Nursing
Applied to Nurse Anesthesia.**

Preadnestic medication histories are completed to identify potential anesthetic implications. It may be important for anesthetists to know about patient use of herbal and/or dietary supplements.

CRNAs formulate anesthetic care plans in order to meet patients' needs for anesthesia to facilitate a medical or surgical procedure. The formulation of anesthetic care plans is viewed as ministration of help within this theory. Ministration of help is defined as nurses' actions that assist patients in meeting their needs for help. CRNAs gather and synthesize information gained in preanesthetic visits and physical assessments in order to formulate appropriate anesthetic care plans. These plans include identifying and preventing potential anesthetic interactions.

The final step in Wiedenbach's (1964) prescriptive theory is validating that patients' needs for help are met. In this step, CRNAs and patients successfully agree upon the anesthetic care plan. Thorough preanesthetic assessments may help prevent events from occurring that might interfere with CRNAs successfully meeting patients' anesthetic needs.

Definitions: Conceptual and Operational

Conceptual Definition of Patient. An individual who is unable to adapt to the demands of a situation, and has a perceived need for help.

Operational Definition of Patient. An individual in need of anesthesia services in two selected USAF hospitals.

Conceptual Definition of Perceived Need for Help. Any measure or action required and desired by an individual that has the potential for restoring or extending the ability to

cope with the demands implicit in a situation.

Operational Definition of Perceived Need for Help. Patients who have a preanesthesia visit with a USAF CRNA in order to formulate a mutually agreed upon anesthesia care plan.

Conceptual Definition of Herbal and Dietary Supplement. Products intended for ingestion by patients as a supplement to the diet to meet a perceived need for help.

Operational Definition of Herbal and Dietary Supplement. Products intended for ingestion as a supplement to the diet, including vitamins, minerals, herbs, and amino acids.

Conceptual Definition of Ministration of Help. Actions of nurses that assist patients meet their needs for help.

Operational Definition of Ministration of Help. A preanesthetic interview and the recommendations or suggestions USAF CRNAs give patients during the interview about preoperative herbal and/or dietary supplement utilization.

Conceptual Definition of Validation Need for Help was Met. Concurrence between nurses and patients that mutually agreed upon plan successfully assisted patients meet their perceived needs for help.

Operational Definition of Validation Need for Help was Met. Concurrence between CRNAs and individual patients that the mutually agreed upon anesthesia care plan meets patients' perceived needs for help.

Assumptions

1. There are patients who undergo anesthesia in USAF hospitals who take herbal

and/or dietary supplements.

2. There may be potential anesthesia implications associated with the use of herbal and/or dietary supplements.

Limitations

1. Data were collected at only one USAF hospital, which limits generalizability of the findings.

2. Only USAF CRNAs were surveyed, which limits generalizability of the findings.

Summary

In this chapter, a description of potential anesthesia implications of herbal and dietary supplement utilization by patients was presented. The importance of asking patients about utilization of these supplements, and preoperative anesthetic recommendations were examined. Weidenbach's (1964) prescriptive theory as the conceptual model was used. The assumptions and limitations were also addressed. In the next chapter, a review of the literature will be presented.

CHAPTER II: REVIEW OF LITERATURE

Introduction

In this chapter, a review of the literature relating to herbal and/or dietary supplement utilization, and potential herbal and/or dietary supplement drug interactions will be presented. Herbal and/or dietary supplement utilization trends will first be addressed. Second, current literature regarding reported and potential herbal and dietary supplement interactions with prescription medications will be reviewed. Finally, the importance of a comprehensive preanesthetic medication history, including herbal and/or dietary supplements, will be described.

Herbal and Dietary Supplement Utilization

The use of herbal and dietary supplements is steadily increasing in this country. A variety of national surveys report as many as one third of the nation's adults currently use herbal and dietary supplements (Johnston, 1997). The sale of these supplements reportedly generated as much as \$6.5 billion in 1996 (Kurtzweil, 1998). Once considered unconventional, self-prescribed herbal remedies are now commonplace. Traditionally found only in health food stores, these supplements can now be purchased in supermarkets, drug stores, magazines, and over the Internet. A 1996 survey published by Herbal Gram found that most of the growth in the herbal supplement market can be attributed to first time users (Wood, 1997). Among herbal supplement users, over 50% reported also taking vitamin and mineral supplements.

The 1994 Dietary Supplement Health and Education Act (DSHEA) established a regulatory framework for the Federal Drug Administration (FDA) to monitor dietary

supplements. The National Institute of Health was also called upon to open an office to coordinate research on dietary supplements and alternative medicine (Kurtzweil, 1998). Under the DSHEA, dietary supplements are defined as any product ingested as a supplement to the diet. This broad definition is in sharp contrast to the definition of a drug. A drug is a product that may be derived from plants, and is intended to diagnose, cure, treat, or prevent disease. The FDA must authorize any drug marketed in this country after reviewing clinical research data showing the efficacy and safety of the drug. The DSHEA provides for guidelines that manufacturers of dietary supplements must follow regarding information and claims contained on labels, but because these supplements are not drugs, the FDA does not authorize or test them (Kurtzweil, 1998).

The use of herbal medicine worldwide has historically been much more prevalent than in this country. A World Health Organization survey reported as many as 80% of the world's population use herbal medicines. A national survey in 1990, reported as few as 3 % of Americans use herbal supplements (Eisenberg et al., 1993). In an attempt to explain this great discrepancy, Frate, Croom, Frate, and Juergens (1996) conducted a survey of a rural, biracial population in Mississippi. The authors sought to use this population to more accurately represent the world population. Seventy percent of respondents (n=251) reported taking at least one herbal medicine within the previous year. The authors concluded that the self-treatment with herbal medicines might be more widespread in this country than previously reported.

Eisenberg et al. (1993) found that the use of conventional therapies with self-prescribed, herbal therapies is not being recognized by healthcare providers. Patients

frequently fail to include their medical providers in the decision to use alternative therapies concurrently with their prescribed, conventional therapies. The use of herbal and dietary supplements in this country is increasing dramatically. A follow-up survey by Eisenberg et al. (1998) reported a 380% increase in herbal supplement use and a 130% increase in megadose vitamin use from 1990. They also found that one in five individuals in the U.S. taking prescription medications also report taking herbal and/or dietary supplements. Additionally, in both 1990 and 1997, less than 40% of patients taking herbal and dietary supplements reported this information to their primary care medical physicians.

In 1997, Crone and Wise surveyed transplant patients in an attempt to describe alternative therapy use, including herbal and dietary supplements. Of the respondents (n=323), 20% reported using herbal and/or dietary supplements, and 67% of these reported self-prescribing the supplements on the advice of friends, family or health food publications without consulting their transplant staff. Most of these patients reported using these supplements to improve their overall health status and reduce their susceptibility to infection caused by immunosuppressant therapy. One patient reported stopping supplement use when therapeutic drug levels of an immunosuppressant declined. This decision was made without consultation with the transplant staff and resulted in normalization of drug levels.

Interest in the use of herbal and dietary supplements by healthcare providers has also increased. Gordon, Sobel, and Tarazona (1998) surveyed 1,250 adult primary care and obstetrics-gynecology providers and 34,000 patients belonging to a large health

maintenance organization (HMO) in Northern California. Forty percent (n=781) of practitioners reported currently using or recommending herbal supplements for their patients. Additionally, 30% (n=781) reported using or recommending megadoses of vitamins or minerals. Of the patients that responded to the survey (n=17,735), 7% reported using herbal supplements in the past year and 15% reported ever using them. Of the respondents, 5% reported using megadoses of vitamins in the previous year and 7% reported ever using megadoses of vitamins. Additionally, 60% of healthcare providers (n=781) would like to have herbal supplements available to patients and 53% of patients (n=1516) would like to have them covered by the health plan.

Herbal and Dietary Supplement Interactions

The use of herbal and dietary supplements is commonly viewed as natural and harmless. There are countless preparations of herbal and dietary supplements that are used for a variety of ailments. These supplements are not licensed, regulated, or required to demonstrate efficacy, purity, safety, or quality (DeSmet, 1995). Many adverse effects have been published related to herbal and dietary supplements. There have also been numerous reports of prescription drug interactions resulting from the concomitant use of herbal and dietary preparations (Marwick, 1995). Because these supplements are not regulated, the active ingredients vary markedly from preparation to preparation. Drew and Meyers (1997) cite several manufacturing problems that contribute to preparation variability. These include misidentification of plant name, lack of standardization of plant components, contamination during manufacture or storage, adulteration of herbal preparations, and incorrect preparation and dosage of herbal products. This adds to the

difficulty in identifying specific adverse reactions and drug interactions.

Drew and Myers (1997) contend that in order to increase reporting of supplement-drug interactions, a classification system of adverse effects is needed. Adverse effects associated with herbal medicine can be classified as intrinsic, relating to the supplement itself, or extrinsic, relating to the manufacture or compounding of the supplement. Additionally, intrinsic reactions can be further classified as Type A, predictable, dose-dependent reactions, or Type B, unpredictable, idiosyncratic reactions. Enst (1998) also classifies intrinsic reactions as allergic or toxic. Drug interactions can be either related to the increase or decrease in pharmacological effect, and are generally classified as Type A reactions.

Winslow and Kroll (1998) reported that the top ten selling herbs in the U.S. in 1995 were echinacea, garlic, goldenseal, ginseng, ginkgo, saw palmetto, ma huang, aloe, Siberian ginseng, and cranberry. Since then, St. John's wort, valerian, and feverfew have become increasingly popular. Patients have reported using these herbal preparations for a variety of ailments ranging from chronic, incurable diseases such as diabetes and arthritis, to self-limiting conditions such as colds and sore throats. Only 5% of herbal and dietary supplements are purchased in pharmacies, and fewer than 40% of patients include their primary care physicians in making decisions to use them. Adverse drug interactions are more likely to occur in patients with chronic medical problems such as renal or liver abnormalities. Currently there are no adequate surveillance systems in place to identify herbal-drug interactions (Eisenberg et al., 1998).

In a comprehensive review of the literature, Miller (1998) reported various potential

or known herb-drug interactions. Echinacea has been associated with hepatotoxicity, which may be potentiated when other hepatotoxic drugs are used. Volatile anesthetics, such as halothane and other anesthetic agents have been demonstrated to reduce hepatic blood flow and could possibly contribute to hepatic dysfunction if administered together with echinacea.

Feverfew, garlic, ginkgo, and ginger have all been demonstrated to prolong bleeding times and should be avoided in patients taking warfarin, aspirin, heparin, and non-steroidal anti-inflammatory drugs (NSAIDs) (Bartels & Miller, 1998). The risk of bleeding may be increased with the concomitant use of these products. Medications that impair platelet aggregation and prolong bleeding times, if not stopped preoperatively, may present a relative contraindication for regional anesthesia (Doak, 1997). In contrast, ginseng has been demonstrated to decrease the effectiveness of warfarin and should not be taken by patients on anticoagulant therapy.

Ginkgo has been reported to diminish the effectiveness of anticonvulsants such as carbamazepine, phenytoin, and phenobarbital by lowering the seizure threshold (Miller, 1998). Ginseng has been associated with augmentation of corticosteroid toxic effects such as psychosis and mania, and should be avoided by patients taking prednisone and in patients with manic-depressive disorders and psychosis (Miller, 1998). Fishman, Catarau, Sachs, Stojanovic, and Borsook (1996) reported several case studies of corticosteroid-induced mania in patients receiving regional anesthesia with a corticosteroid that may be compounded in patients taking ginseng.

St John's wort may have a monoamine oxidase (MAO) inhibitory effect and should

be avoided in patients taking MAO inhibitors, tricyclic antidepressants, selective serotonin reuptake inhibitors, and sympathomimetic drugs (Tyler, 1998). Potentially severe reactions have been demonstrated when indirect acting sympathomimetic agents, such as ephedrine, are used in patients receiving MAO inhibitors. Equally severe reactions have been reported when selected opioids, such as meperidine, are administered to patients taking MAO inhibitors (Doak, 1997).

Valerian has been shown to potentiate the effects of barbiturates, which may lead to coma. It may be best to avoid thiopental or methohexital in patients taking valerian. Kava has been associated with excessive sedation when used concomitantly with alprazolam. Potential implications may exist with the commonly used preoperative anxiolytic, midazolam in patients taking kava preoperatively (Miller, 1998).

Vitamins and minerals have also been implicated in drug interactions (DeSmet & D'Arcy, 1996). Vitamin B6 can nullify the effects of L-dopa in patients with Parkinson disease. Intraoperative Parkinsonism has been associated with a neuroleptic malignant-like syndrome potentially creating unnecessary and inappropriate delay in diagnosis and treatment (Smith, Muir, & Hall, 1996). Folic acid has been associated with decreased levels of phenytoin. Patients on phenytoin for control of seizures that are taking large doses of folic acid may be at increased risk of seizures when given agents that decrease the seizure threshold, such as enflurane or etomidate. Large doses of vitamin C can alter urinary pH resulting in decreased elimination of some drugs. Iron supplements can form iron-drug complexes with many drugs, which may reduce the extent of absorption. Chromium may decrease insulin requirements, which can lead to hypoglycemia if

unrecognized or unmonitored. Zinc and vitamin E have been shown to decrease the immunosuppressive effect of cyclosporine (Miller, 1998). Grapefruit juice can increase the bioavailability of many drugs, including cyclosporine and calcium channel antagonists, by inhibiting cytochrome P450 enzymes leading to potentially toxic serum concentrations (Ernst, 1998). Intraoperative use of a calcium channel antagonist may cause profound and unanticipated deleterious effects if this interaction is unrecognized.

Preanesthetic Medication Assessment

The preanesthetic assessment is completed by the anesthesia provider to acquire pertinent medical information, including medication history. This information is then used to assess patients' conditions in order to formulate the appropriate anesthesia plan and ensure their health is in optimal condition prior to receiving the anesthetic. The preoperative assessment also provides anesthesia providers an opportunity to reduce patients' anxiety by educating them regarding anesthetic plans and the postoperative period (Kitts, 1997).

Drew and Myers (1997) emphasize the importance of including herbal supplements in patients' medication histories. They note that most patients do not consider herbal and dietary supplements as medications, but rather as food supplements, and many healthcare providers share this opinion. Anesthesia providers may now be recognizing the potential implications of herbal supplement use. The internet anesthesia discussion group GASNET included a posting about the cancellation of anesthesia due to unrecognized preoperative use of herbal supplements. As a patient presented for a lumbar sympathetic block, herbal supplement use was identified and a bleeding time obtained. The procedure

was delayed and “ I now tell everyone no herbal remedies for ten days prior to anesthesia” (Fenton, 1998, p. 1). Additional concerns related to herbal-anesthetic interactions were discussed on CRNATALK. The lack of information relating to bleeding complications in patients taking ginkgo was presented as an important perioperative anesthesia concern (Gunn, 1998).

The standard of care for both anesthesiologists and CRNAs includes a medication history as part of the preanesthetic assessment. The information gained in the preanesthetic medication assessment assists anesthesia providers in determining the risk of continuing or discontinuing drug therapy. This decision is based on the pharmacokinetic profile of the drug and its metabolites (Doak, 1997). Safe anesthesia care includes identification and prevention of untoward drug interactions. As providers become better aware of the widespread use and effect of herbal and dietary supplements, they will be better prepared for potential interactions. Communication between patients and providers is imperative to ensure appropriate identification of preoperative use of all medications, including herbal and dietary supplements (Murphy, 1999).

Summary

In this chapter, a review of the current literature about herbal and dietary supplement use was presented. Some of the many potential and known herbal and dietary supplement-drug interactions were described. Anesthetic implications relating to herbal interactions were presented. Finally, the importance of including these supplements in the preanesthetic assessment was addressed. In the next chapter, the study design and methodology will be presented.

CHAPTER III: METHODS

Introduction

In this chapter, the research design is described and a description of the sample and setting is presented. The variables collected and the survey tool used is explained. Finally, a description of the data analysis techniques is presented.

Research Design

In this research, a descriptive, two-phased design was used. In Phase I, a seven-item questionnaire was mailed to all USAF CRNAs after appropriate IRB approval (see Appendix A). The questionnaire contained items about current practice of USAF CRNAs' preanesthetic inquiry about herbal and dietary supplement utilization. The questionnaire included an item about recommendations USAF CRNAs give patients who report taking herbal and dietary supplements preoperatively. Finally, demographic data regarding length of time as a CRNA, size of facility currently working, and number of anesthetics administered monthly were collected.

In Phase II of the study, the utilization of herbal and dietary supplements by patients undergoing anesthesia was examined (see Appendix B). Included was demographic data, specific supplements, including dosage and frequency, and duration of time patients report taking the supplements. These data were collected on all patients presenting to the preanesthetic clinic at a military hospital on the East Coast over a period of two weeks.

Sample

In Phase I, a listing of all USAF CRNAs was obtained from USAF Personnel Command after appropriate USAF IRB approval. The seven-item questionnaire was pilot

tested by five non-USAF military CRNAs for clarity and readability. After a USAF survey control number was obtained, the questionnaire was mailed to all USAF CRNAs. In Phase II, USAF CRNAs stationed at a military hospital on the East Coast were asked to complete the tool shown in Appendix B for a period of two weeks. The data were collected as patients had their preanesthetic assessments. The data collected did not include any patient identifiers.

Protection of Human Rights

The Phase I survey was sent to all USAF CRNAs after approval from the Uniformed Services University of the Health Sciences (USUHS) IRB and a USAF survey control number was obtained. The Phase II herbal and dietary supplement-tracking tool was completed after IRB approvals from USUHS and the hospital where data were collected were obtained.

The Phase I survey and Phase II tracking tools did not include any identifying information about USAF CRNAs or patients included in the data collection. Data collected was maintained as confidential and was used for descriptive purposes only.

Plan for Data Analysis

Data collected in Phase I was analyzed using descriptive statistics. Frequencies were tabulated for the variables of interest. The proportion of CRNAs who reported asking about herbal and dietary supplement use as important was computed. The number of CRNAs who make recommendations about herbal and dietary supplement use was analyzed, including a summary of specific recommendations. Finally, frequency distributions were generated that describe USAF CRNAs who suspect they have seen an

anesthesia-supplement interaction.

Phase II analysis included a description of the number of patients who reported using herbal and dietary supplements. Analysis also includes type of supplement, frequency of use, and duration of use. Additionally, demographic differences were described using frequency distributions.

Summary

In this chapter, the methodology used in this study was presented. The research design was explained and the sample specified. Human protection and proposed IRB approval were described. Finally, the plan for data analysis was presented.

CHAPTER IV: ANALYSIS OF DATA

Introduction

In this chapter, the data collected will be presented and analyzed using descriptive statistics. Data from the USAF CRNA questionnaire used in Phase I of the study will be presented first. Phase II data collected during the preanesthetic assessment at a military hospital on the East Coast will then be presented.

Phase-I data analysis

The seven-item questionnaire mailed to 220 USAF CRNAs was completed by 126 respondents for a return rate of 57%. Items 5 to 7 were analyzed by percentage of respondents in each of the four categories included providing a demographic description of the sample. Items 1 to 4 were analyzed by percentage of positive and negative responses and then cross-tabulated using items 5 to 7 to additionally describe the data. All comments made on the first four items were individually listed at the end of each question analysis.

Question five described the facility size that each USAF CRNA currently practices. The majority of respondents (52%) reported practicing in a facility with less than 50 beds. Similar percentages of 16%, 15%, and 17% reported practicing in facilities of 50-99 beds, 100-150 beds, and greater than 150 respectively (see Table 1). Question six described the number of anesthetics administered monthly. The majority of respondents (57%) reported administering greater than 150 anesthetics per month. Twenty percent reported they administer 50-99 anesthetics per month, 15% reported they administer less than 50 anesthetics per month, and 11% administer 100-150 anesthetics per month (see

Table 2). Question seven addressed length of time of anesthesia practice. The majority of respondents (56%) reported practicing less than five years, followed by 26% practicing for five to nine years, 10% practicing for 10-15 years, and 7% practicing for greater than 15 years (see Table 3).

Table 1.

Survey Question 5: In What Size Facility Do You Currently Practice?

< 50 beds	50-99 beds	100-150	> 150 beds
52%	16%	15%	17%

Table 2.

Survey Question 6: How Many Anesthetics Do You Administer Monthly?

< 50	50-99	100-150	> 150
15%	20%	11%	57%

Table 3.

Survey Question 7: How Long Have You Been a CRNA?

< 5 years	5-9 years	10-15 years	> 15 years
56%	26%	10%	7%

The first item on the questionnaire was “Do you ask your patients if they are taking any herbal and dietary supplements during the preanesthetic assessment?” Of the 126 respondents, 58% (n=73) reported that they do include herbal and dietary supplements in the preanesthetic assessment versus 42% (n=53) that reported they do not include herbal and dietary supplements in their preanesthetic assessment. Many of the respondents who answered “yes” to this question commented that they occasionally, but not regularly ask patients about herbal and dietary supplement use. A number of respondents reported that they have recently started to ask about supplement use as a result of anesthesia seminar and journal articles. A common theme included in comments by those answering “no” to this question was that they should ask, but don’t always (see Appendix C). Of the 58% who consistently answered “yes” to item one, the majority (56%) practice in facilities with less than 50 beds. Additionally, 52% of those who answered “yes” administered more than 150 anesthetics monthly, and 53% have been practicing less than five years (see Table 4).

Table 4.

Survey Question 1: Do You Ask Your Patients About Herbal and Dietary Supplement Use in the Preanesthetic Assessment?

	<u>Total</u>	<u>Yes</u>	<u>No</u>
	100%	58%	42%
<u>Facility Size</u>			
< 50 beds	100%	63%	37%
50-99 beds	100%	43%	57%
100-150 beds	100%	63%	37%
> 150 beds	100%	48%	52%
<u>Monthly Anesthetics</u>			
< 50	100%	65%	35%
50-99	100%	54%	46%
100-150	100%	57%	46%
> 150	100%	56%	44%
<u>Years as CRNA</u>			
< 5 years	100%	55%	45%
5-9 years	100%	67%	33%
10-15 years	100%	38%	62%
> 15 years	100%	67%	33%

The second question was: "Do you think it is important to include herbal and dietary supplements as part of the preanesthetic medication assessment?" Of the 126 respondents, 85% (n=107) stated "yes" and 15% (n=19) stated "no". Many of the respondents who answered "yes" to this question commented that some supplements could affect coagulation. Supplements containing ephedrine and MAO-I type substances were also frequently cited as having a potentially important impact on anesthesia (see Appendix D). Of those that stated "yes", 52% practiced in facilities with less than 50 beds, 52% administered more than 150 anesthetics monthly, and 54% had been practicing less than five years. Of those that answered "no", 47% practiced in facilities with less than 50 beds versus 26% who practiced in facilities with greater than 150 beds (see Table 5).

Table 5.

**Survey Question 2: Do You Think It Is Important To Ask Patients About Herbal
and Dietary Supplement Use in the Preanesthetic Assessment?**

	<u>Total</u>	<u>Yes</u>	<u>No</u>
	100%	85%	15%
<u>Facility Size</u>			
< 50 beds	100%	85%	15%
50-99 beds	100%	86%	14%
100-150 beds	100%	89%	11%
> 150 beds	100%	76%	24%
<u>Monthly Anesthetics</u>			
< 50	100%	85%	15%
50-99	100%	92%	8%
100-150	100%	86%	14%
> 150	100%	82%	18%
<u>Years as CRNA</u>			
< 5 years	100%	80%	20%
5-9 years	100%	91%	9%
10-15 years	100%	85%	15%
> 15 years	100%	100%	0%

Question three was: "Do you make recommendations for patients that report taking herbal and dietary supplements?" Of the 126 respondents, 53% (n=67) reported "yes" while 47% (n=59) reported "no" to making recommendations to patients that report taking herbal and dietary supplements. The most common comment made by those who answered "yes" to this question was to discontinue taking supplements preoperatively. Many stated that they recommend discontinuing supplement use anywhere from 24 hours to two weeks prior to surgery. Other comments included specific recommendations for specific supplements such as St. John's wort, ginkgo, and ephedrine-type supplements (see Appendix E). Of those who reported making recommendations, 52% practice in facilities with less than 50 beds, 55% administer more than 150 anesthetics monthly, and 51% have been practicing less than five years. Of those who answered "no" to question three, the percentages were very similar to the "yes" respondents (see Table 6).

Table 6.

**Survey Question 3: Do You Make Recommendations to Patients Reporting Herbal
and Dietary Supplement Use in the Preanesthetic Assessment?**

	<u>Total</u>	<u>Yes</u>	<u>No</u>
	100%	53%	47%
<u>Facility Size</u>			
< 50 beds	100%	54%	46%
50-99 beds	100%	48%	52%
100-150 beds	100%	58%	42%
> 150 beds	100%	52%	48%
<u>Monthly Anesthetics</u>			
< 50	100%	50%	50%
50-99	100%	58%	42%
100-150	100%	43%	57%
> 150	100%	43%	57%
<u>Years as CRNA</u>			
< 5 years	100%	48%	52%
5-9 years	100%	48%	52%
10-15 years	100%	77%	23%
> 15 years	100%	78%	22%

Question four was: "Have you ever suspected an anesthesia-herbal or dietary supplement reaction?" Of the 126 respondents, 12% (n=15) responded "yes" and 88% (n=111) responded "no". The most commonly cited anesthesia-supplement reactions involved coagulation problems, increased heart rate, and hypo- or hypertension (see Appendix F). Of the 12% responding "yes", 67% practiced in facilities less than 50 beds, 47% administered more than 150 anesthetics monthly, and 60% had been practicing less than five years. Of the 88% of respondents who answered "no", 48% practiced in facilities with less than 50 beds, 54% administered more than 150 anesthetics monthly, and 55% had been practicing less than five years (see Table 7).

Table 7.**Survey Question 4: Have You Ever Suspected an Anesthetic-Herbal or Dietary****Supplement Reaction?**

	<u>Total</u>	<u>Yes</u>	<u>No</u>
	100%	12%	88%

Facility Size

< 50 beds	100%	14%	86%
50-99 beds	100%	5%	95%
100-150 beds	100%	5%	95%
> 150 beds	100%	14%	86%

Monthly Anesthetics

< 50	100%	20%	80%
50-99	100%	4%	96%
100-150	100%	14%	86%
> 150	100%	10%	90%

Years as CRNA

< 5 years	100%	13%	87%
5-9 years	100%	12%	88%
10-15 years	100%	0%	100%
> 15 years	100%	11%	89%

Phase II Data Analysis

Phase II data were collected over a two-week period at the preanesthetic clinic at a military hospital on the East Coast. A total of 86 patients were included in the data collection. The age mean was 41 years (range 33-77). Gender, race, and military status of patients were recorded. In the sample there were 45% male and 55% female, 70% Caucasian, 21% Black, 3% Asian, and 6% Hispanic. Forty-one percent of the sample was active duty, 29% were retired, and 30% were family members.

Of the 86 patients questioned, 12% (n=10) reported taking herbal supplements. Of the 12% of reported herbal supplement users, the mean age was 54 years (range 33-72). Additionally, 40% were male and 60% were female. Sixty percent were Caucasian, 20% Black, 10% Asian, and 10% Hispanic. Military status of the herbal supplement group included 30% active duty, 30% retired, and 40% family member. One herbal supplement, glucosamine, was reported by two patients. Other supplements reported included shark cartilage, ginkgo, herbal tea, garlic suppository, rhinoceros horn powder, St. John's wort, hawthorn berry, saw palmetto, gingerroot, and alfalfa.

Twenty-four percent (n=21) of the 86 patients reported using dietary supplements. The mean age of reported dietary supplement users was 51 years (range 2-71). Forty-eight percent were male, 52% female, 76% Caucasian, 14% Black, 5% Asian, and 5% Hispanic. Military status showed equal distribution of 33% for active duty, retired, and family members. The most frequently cited dietary supplement was multi-vitamins (48%). Additionally reported dietary supplements included vitamins B, C, and E, calcium and iron (see Table 8).

Table 8.**Preanesthetic Assessment of Reported Herbal and Dietary Supplement Use.**

	<u>Total</u>	<u>Herbal</u>		<u>Dietary</u>	
		<u>Yes</u>	<u>No</u>	<u>Yes</u>	<u>No</u>
<u>Sample</u>	100%	12%	88%	24%	76%
M	100%	10%	90%	23%	77%
F	100%	13%	87%	23%	77%
C	100%	10%	90%	25%	75%
B	100%	11%	89%	17%	83%
A	100%	33%	67%	33%	67%
H	100%	20%	80%	20%	80%
AD	100%	9%	91%	17%	83%
R	100%	12%	88%	28%	72%
FM	100%	15%	85%	27%	73%

Note: (M=Male, F=Female, C=Caucasian, B=Black, A=Asian, H=Hispanic, AD=Active Duty, R= Retired, FM= Family Member).

Summary

In this chapter, data from Phase I and Phase II were analyzed using descriptive statistics. A description of the demographic differences of USAF CRNAs was reported. The four questions of interest were analyzed. The demographics of the sample in Phase II were described. Frequencies of herbal and dietary supplement use from the Phase II data were presented.

CHAPTER V: SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

Introduction

In this chapter, conclusions regarding the analyzed data will be made. Similarities and differences in each item of interest will be summarized. Limitations in the study that may be improved by additional research will be presented. Finally, recommendations for further study will be made.

Conclusions

The purpose of this study was to describe current practice of USAF CRNAs with respect to patient use of herbal and dietary supplements. Additionally, patient use of herbal and dietary supplements as identified in the preanesthetic assessment was described. In Phase I of the study, USAF CRNAs were surveyed using a seven-item questionnaire. In Phase II of the study, patients presenting to a preanesthetic clinic at a military hospital on the East Coast were asked about herbal and dietary supplement use.

Question one was: "Do USAF CRNAs ask patients about herbal and dietary supplement use in the preanesthetic medication assessment?" Of 126 USAF CRNA respondents, 58% reported that they do ask their patients about herbal and dietary supplement use in the preanesthetic assessment. An important theme that was reported with respect to this question was that USAF CRNAs have started asking patients about herbal and dietary supplements as a result of recently published journal articles, news items, or seminar discussions regarding the potential for anesthesia-supplement interactions. Of those respondents (42%) who answered "no" to this question, many stated that they don't currently ask but acknowledge that this issue is becoming more

important and may become a routine part of the preanesthetic assessment.

Item two of the questionnaire was: "Do USAF CRNAs think it is important to include herbal and dietary supplements in the preanesthetic assessment?" The overwhelming majority of respondents (85%) answered "yes" to this question. As stated previously, many respondents commented that although they don't always include herbal and dietary supplements in their preanesthetic assessment, they think it is becoming an important issue to address.

The third research question was: "Do USAF CRNAs make recommendations to patients reporting herbal and dietary supplement use in the preanesthetic assessment?" The response to this question revealed an almost equal number of "yes" (53%) and "no" (47%) answers. The most common comment made by respondents was that they recommend discontinuing herbal and dietary supplements for at least 48 hours prior to surgery. Of the "no" respondents, many stated that the preanesthetic visit is done either the day before or the day of surgery, so recommendations before surgery are not feasible.

Item four asked USAF CRNAs if they had ever suspected an anesthesia-supplement reaction. Of 126 respondents, 12% reported that they had suspected an herbal and dietary supplement interaction. The most common interactions included coagulation problems and sympathetic nervous system alterations, either hypotension or hypertension.

In Phase II of the study, 86 patients presenting to the preanesthetic clinic for a period of two weeks were asked about herbal and dietary supplement use. Of the 86 patients questioned, 12% reported herbal supplement use and 24% reported dietary supplement use. The majority of herbal and dietary supplement users were female and Caucasian;

however, an equally greater percentage of the sample also was female and Caucasian. No single herbal supplement was reported with greater frequency; however, the majority of dietary supplement users reported taking multi-vitamins.

Recommendations

Further research into patient use of herbal and dietary supplements and anesthesia provider practice regarding herbal and dietary supplements is warranted. Several limitations in this study affect the interpretation of the results. The sample of 86 patients was limited to one USAF medical center. Larger studies, such as that recently published by Norred, Zamudio, and Palmer (2000) in the American Association of Nurse Anesthetist Journal, help describe the extent of herbal and dietary supplement use nationwide. Additionally, the sample of anesthesia providers surveyed was limited to USAF CRNAs. Larger scale studies examining nationwide practice by not only CRNAs, but also anesthesiologists both in the military and civilian sector, would improve the generalizability of the results. As previously discussed, research into specific compounds found in herbal and dietary supplements to identify potential interactions with anesthesia and other medication is warranted. Wiedenbach's Prescriptive Theory of Clinical Nursing (1964) provides a framework for additional research into the need for help (preanesthetic assessment), the ministrations of help (formulation of patient specific anesthesia plan), and the validation the need for help was met (mutually agreed upon anesthesia plan and intra- and post-operative patient assessment). As more research into the use of herbal and dietary supplement use and the potential for interaction with anesthetics is completed, continued improvements in anesthesia safety can be maintained.

Summary

In this chapter, conclusions and interpretations regarding the study data were presented. Limitations in this study were described. Recommendations for further research were made.

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APPENDICES

Appendix A. Herbal and Dietary Supplement Questionnaire.

Appendix B. Herbal and Dietary Supplement Data Collection Tool.

Appendix C. Comments to Survey Question 1.

Appendix D. Comments to Survey Question 2.

Appendix E. Comments to Survey Question 3.

Appendix F. Comments to Survey Question 4.

Appendix A

Herbal and Dietary Supplement Questionnaire

Uniformed Services University of the Health Sciences
Graduate School of Nursing- Dept. of Nurse Anesthesia
4301 Jones Bridge Road
Bethesda, MD 20814
(301) 295-0979

To USAF CRNAs:

I am a graduate student in Nurse Anesthesia at the Uniformed Services University of the Health Sciences (USUHS). I am conducting a research study on the preanesthetic assessment of herbal and dietary supplements. The purpose of my study is to describe patient use of herbal and dietary supplements, as well as current practice of USAF CRNAs with respect to these supplements in the preanesthetic assessment.

Your voluntary participation in this study is requested. All responses are confidential and no identifying information will be collected. The USUHS institutional review board (IRB) and the USAF have approved the study. The chair of my thesis committee is Maura McAuliffe, Ph.D, CRNA. Please feel free to contact her at the above address if you have any questions.

The following questionnaire will take approximately 5 minutes to complete. Please do not include your name on the survey. Use the enclosed self-addressed, stamped envelope to return the completed questionnaire. Please use the spaces provided to make any additional comments that you may have. You can contact me if you have any questions or comments regarding this study. Thank you for your participation in this nursing anesthesia research.

Sincerely,

Paul M. Effertz, Capt, USAF NC
4028-4 Ashwood Circle
Andrews AFB, MD 20762
(301) 599-6735

1. Do you ask your patients if they are taking any herbal and/or dietary supplements as part of the preanesthetic medication assessment?

YES _____ NO _____ COMMENTS _____

2. Do you think it is important to include herbal and/or dietary supplements as part of the preanesthetic medication assessment?

YES _____ NO _____ WHY _____

3. If your patients report taking any herbal and/or dietary supplements, do you have any recommendations for them in anticipation of anesthesia? (Please list specific recommendations)

YES _____ NO _____ COMMENTS/ SPECIFIC
RECOMMENDATIONS

4. Have you ever suspected that a patient may have had an anesthesia-herbal/dietary supplement reaction?

YES _____ NO _____ PLEASE DESCRIBE _____

5. In what size facility do you currently practice?

1) < 50 beds _____ 2) 50-99 beds _____ 3) 100-150 beds _____ 4) > 150 beds _____

6. At your facility, how many anesthetics are administered monthly?

1) < 50 _____ 2) 50-99 _____ 3) 100-150 _____ 4) > 150 _____

7. How long have you been a CRNA?

1) < 5 yrs _____ 2) 5-9 yrs _____ 3) 10-15 yrs _____ 4) > 15 yrs _____

This is only a sample listing of herbal and dietary supplements patients commonly use, however I am interested in any and all they may report taking.

Dietary Supplements

Chromium

Ensure

Folic Acid

Iron

Multivitamins

Vitamin B12

Vitamin B6

Vitamin C

Vitamin E

Zinc

Herbal Supplements

Aloe

Echinacea

Feverfew

Garlic

Ginger

Ginkgo

Ginseng

Goldenseal

Ma Huang

Saw palmetto

St. John's wort

Valerian

Appendix B

Herbal and Dietary Supplement Data Collection Tool

Prenesthetic Assessment of Herbal and Dietary Supplements

Date mm/dd/yy	Pt. Age (yrs)	Gender M-male F-female	Ethnicity C-Caucasian B-Black A-Asian H-Hispanic O-Other	Military Status AD-Active FM-Family R-Retired C-Civilian	List herbal supplements Include (if available): Dosage Quantity/day	Duration (months)	List dietary supplements Include (if available): Dosage Quantity/day	Duration (months)

Appendix C

Comments to Survey Question 1

The following comments were made by respondents who answered "yes" to survey question 1, "Do you ask patients about herbal and dietary supplement use in the preanesthetic medication assessment?":

- prescribed medications or OTC is the way I mention it
- usually
- I also take several herbal products which I have researched so I am in tuned to possible interactions
- although not as much now that phen-fen is no longer FDA approved
- since anesthesia seminar 1999
- recently included this question as patients do not consider these as medications
- dietary especially (include phen-fen and other diet drugs in this group)
- just began asking within last two months
- sometimes
- sometimes I forget as I incorporate it into my practice, but just started recently
- I ask only of vitamins or iron, inconsistent, but not all patients
- sometime if the respond yes to are you dieting
- I also ask about OTCs in general
- our anesthesia questionnaire asks for any herbal and dietary supplements that the patient is taking
- I've only done so as a result of January or February 2000 AANA Journal article addressing this subject
- most patients don't consider supplements as drugs

- I sometimes try to include it but overlook this question about 50% of the time
- but limited
- many contain ephedrine

Of those who answered “no” to “Do you ask patients in the preanesthetic assessment about herbal and dietary supplement use?”, comments included:

- if patient mentions taking something for weight loss that I feel could include a stimulant or similar ingredient I make note of it but don’t usually ask about them specifically
- I think that it is important but unfortunately fail to ask patients about herbals more than 75% of the time
- I suppose I should
- very rarely
- not specifically
- rarely
- not specifically
- ask if they take any medications
- not regularly
- I admit I should be doing this but usually don’t
- prescription or non-prescription drugs
- never thought of it
- the question is posed by the RN in the preop clinic as part of the nursing assessment and if they answer yes additional information is obtained by me

- I have not in the past but our new department policy will have us asking about these dietary additives in the near future
- I ask patients if they are taking any meds to include vitamins
- sometimes I ask but not every time

Appendix D

Comments to Survey Question 2

Comments made by those who answered "yes" to "Do you think it is important to include herbal and dietary supplements as part of the preanesthetic medication assessment?" included:

- possible interactions
- it affects their physical status and condition
- may have interactions with anesthetics
- some herbal and dietary supplements that affect coagulation, gastric irritation, etc.
- possible anesthetic interactions and impacts on surgery, i.e. coagulation changes
- reported drug interactions with anesthetics, i.e. St. John's wort
- may alert to possible bleeding and vital sign problems
- some have effects that could impact anesthetic either directly or indirectly
- because of effect they can have on anesthetic and surgery
- body building formulas may contain ephedra
- St. John's wort was like Prozac with anesthetic impact possible
- potential interactions with anesthetics
- some patients are taking huge volumes of these things with potential side effects
- some significantly interact with anesthesia drugs
- some may alter the effects of some anesthetic drugs
- some contain ingredients that are natural forms of some medications that have serious side effects
- if they contain ephedrine or caffeine it can effect your anesthetic
- some will affect anesthesia, i.e. St. John's wort is a MAOI

- many of the dietary supplements act as sympathomimetics and could effect the hemodynamics of the patient
- some herbals can have an effect on anesthesia
- potential interactions with medications patient may be taking and those given by anesthesia provider
- some such as ma huang may have an effect on the anesthetic or patient response to anesthesia
- could possibly contain substances with significant impact on anesthesia
- certain herbals have an effect on clotting mechanisms and some act as MAO inhibitors
- because the increased documentation in current literature justifies the subject being brought up
- interaction with anesthesia drugs
- interactions with anesthesia drugs
- drug reactions and bleeding
- should start asking now as more and more literature is coming out about supplements having multiple effects on coagulation, electrolytes, and the heart
- interactions
- some supplements may have vasoactive effects or influence metabolism of anesthetic drugs
- recent articles have addressed herbal supplements' side effects which caused me to pay more attention

- some interact with some of our anesthetic drugs
- some have interactions and physiologic consequences
- actually I never looked into it until the article in the current AANA Journal came out
- have begun to read more about these interactions with anesthetic drugs and some adverse effects
- many supplements have implications related to medication interactions and vital signs patients present with
- it is getting more important
- probably as some of these affect clotting and other physiological mechanism
- interactions
- most common is platelet problems with potential for increased bleeding
- some include ephedrine and may alter mood, heart rate and blood pressure
- multiple potential drug interactions
- much more widespread use by patients
- information seems to indicate the potential for significant interactions with a variety of routine medications
- many herbs and dietary supplements have side effects and act as drugs
- until recently I would have said no but the news has brought forward a number of reactions and interactions with other pharmaceuticals
- effect on level of consciousness and coagulation
- there are potential interactions between these substances
- there are a number of potential drug interactions that are potential

- because of the numbers of supplements that include coumarins, ephedrine, or other stuff that will impact my anesthetic
- St. John's wort, ginkoba can affect anesthetic
- many medications such as St. John's wort, valerian, ginkgo can have significant effects on what we do and can affect anesthetic
- interaction with drugs and herbals
- important because many herbal and dietary supplements can cause various effects on pulse, blood pressure, clotting and bleeding times
- certain herbal and dietary supplements may have direct effect on anesthetic
- I have seen several short news items on interactions of herbals and anesthesia
- as the effects of these medications become more widely know, we need to be aware of them
- reports of heart valve damage from diet pills and reports of ephedra side effects highlight the need to evaluate patients use
- it might very well be important and I may change the way I query patients concerning medications including supplements
- it is still new and if patients indicate they take vitamins I usually remember to ask
- interactions of certain herbal remedies, i.e. St. John's wort
- anesthetic medication interactions
- now I do
- some of these supplements contain sympathomimetic compounds
- I do not know the effects of herbals on anesthesia but some have side effects

- recently lots of medical journals recommend asking about herbs as some herbs have been found to interact with some medications

The following comments were included by respondents who answered “no” to “Do you think it is important to include herbal and dietary supplements as part of the preanesthetic medication assessment?”:

- have not considered it in the past
- their effect is minimal if any
- question presented as what medications
- prescription or OTC
- do you take on a regular basis
- not sure
- most supplements are no better than placebos
- don't have an opinion either yes or no
- too many variables due to non-standardized dosages and effects
- I haven't really thought about it that much
- most, if not all do not have long term effects on health

Appendix E

Comments to Survey Question 3

The comments made by respondents who answered "yes" to "Do you make recommendations to patients that report taking herbal and dietary supplements in the preanesthetic assessment?" included:

- depending on what herbals and conditions they are in to stop or continue
- stop taking two weeks prior to anesthesia
- depends on what they are taking
- usually if there are not side effects or contraindications for anesthesia I don't bother
- if it was phen-fen, must be off for one month and no evidence of pulmonary hypertension, most other need to be off for two or more weeks
- would get coagulation profile if on ginkgo or ginger
- discontinue use until after surgery
- patients usually seen less than 24 hours before surgery
- depends on the specific supplement
- in general, do not have them take anything other than cardiac drugs morning of surgery
- stop taking them
- do not take for one week
- preferably two weeks prior to surgery
- depends on herbs and supplements
- I ask them to stop taking the stimulant supplements and any that alter mood prior to surgery
- depending on what the supplement I may have them stop taking them for at least

three days prior to surgery and for others I recommend no change

- I ask that the patient refrain from taking the supplement if it will affect the patient's hemodynamics
- stop taking herbals seven days prior to surgery
- asked not to take five to seven days prior to surgery
- no ma huang or ephedrine-like and no St. John's wort
- stop at least 48 hours before anesthetic
- stop taking them three to five days prior
- discontinue prior to anesthesia
- I instruct them to hold morning of surgery
- depends on what they are taking
- I have not caught one in a preoperative evaluation
- stop one week as with aspirin or motrin
- herbal supplement specific
- recommend they stop taking supplements one week prior to surgery and to discuss this with the surgeon
- but only to a minor extent
- the extract from the Willow tree has aspirin effects, consequently decrease platelet function so they should stop taking this extract prior to surgery
- I ask them to discontinue until after surgery
- stop taking them for two weeks prior to surgery
- I refer to drug/herbal interaction resources and make recommendations accordingly

- if possible, stop taking these approximately 10-14 days pre-operatively, otherwise if the pre-op is taking place a day or two prior to surgery at least I have an idea of what may adversely impact my plan
- discontinue one to two weeks before surgery
- ginkgo can alter platelet function so hold two weeks prior
- St. John's wort should hold and valerian do not take
- hold off for nine days or if less than that until surgery then have them hold off until post-op
- discontinue St. John's wort the day before surgery
- stop taking as soon as possible
- stop two weeks prior to surgery
- I call the pharmacist to evaluate drug interactions with anesthesia medications
- nothing by mouth (NPO) day of surgery
- stop taking them in advance of surgery
- stop taking them, I ask them to stop taking them prior to surgery
- I recently have heard of anesthetic complication from ephedra and ginkgo so I would ask them to discontinue them
- NPO- they can start taking them again post-op
- stop taking them
- recommend that they stop taking for two weeks
- usually ask them not to take it, but that depends on what they are taking, i.e. I will stop St. John's wort but will continue something like calcium supplements

- we are pretty much asking them to hold them for two weeks prior to surgery
- stop one week in advance
- if they are taking any kind of ephedrine I ask them to stop several days prior to surgery if possible
- discontinue vitamin C, vitamin E and ginkgo prior to surgery
- stop for two weeks prior to elective surgery
- discontinue two weeks before surgery
- discontinue use two weeks prior to surgery if possible
- depends on type of surgery, anesthetic, overall health
- sometimes recommend holding supplements pre-op
- refrain from taking weight loss supplements for at least two weeks
- avoid ginkgo for at least one week
- avoid any ephedra containing supplements pre-op
- discontinue use of St. John's wort at least one week prior
- stop two weeks prior if possible
- ask them to stop taking St. John's wort for two to three weeks prior
- stop ma huang or ephedra immediately
- withhold these dietary supplements two weeks pre-op
- stop couple of days prior
- discontinue supplements two weeks before surgery
- stop taking herbal and dietary supplements due to possible cardiovascular effects
- discontinue supplements two to three weeks prior if possible

- depends on the herb or supplement
- I recommend the stop taking appetite suppressants until after surgery

The comments that respondents who answered “no” to “Do you make any recommendations to patients that report taking herbal and dietary supplements in the preanesthetic medication assessment?” include:

- if necessary I will refer to Herbal PDR this facility maintains
- usually not
- it depends on what they are taking
- usually see patient before surgery so it’s unlikely to change outcome
- usually see day of procedure
- just like to be aware they are taking them
- we do suggest stopping vitamin E as it can have a similar effect as aspirin on clotting
- in most cases no
- I make necessary changes to avoid potential complications
- we usually see them the day of surgery
- I don’t know enough about these supplements
- not at present
- do not know enough about these interactions
- I am not aware of which herbs/supplements to be concerned about let alone what to do in respect to anesthesia
- I have minimal knowledge of herbal medicines
- again no opinion as I am unaware of the use of this stuff

- other than normal NPO requirements
- don't see much use here in my practice
- occasional ginkgo and St. John's wort
- pre-ops most often done day of surgery so unlikely to have hold these medications for any significant amount of time
- most pre-ops are done by doctors prior to us seeing them so it's too late for recommendations
- at this facility we rarely see a pt anytime before the day of the operation
- we are currently becoming more aware of herbal usage and are trying to establish guidelines
- I have never had anyone say yes but I have only been asking about three weeks

Appendix F

Comments to Survey Question 4

The comments made by respondents who answered "yes" to "Have you ever suspected an anesthesia-supplement reaction?" included:

- only that the variety of metabolism boosters in males increases the dosage of propofol necessary to have lack of lid reflex
- patient became extremely hypotensive on induction requiring fluid resuscitation and mother later stated that patient had been taking herbal supplement that caused her to have extreme diarrhea for several weeks
- increased bleeding and hypertension
- intraoperative hypotension, hypertension and increased bleeding and clotting abnormalities
- severe hypotension after intubation and throughout case in patient that was on an herbal supplement that caused diarrhea requiring significant fluid resuscitation for our facility
- increased blood pressure and heart rate in a few patients taking supplements that likely contained ephedrine
- increased bleeding time with ginkgo and increased blood pressure with St. John's wort in an otherwise healthy 40 year old
- those patients who respond with increased bleeding and nothing to account for it and those patients with extreme hypertension
- patients taking oriental extracts containing ephedrine had high resting heart rates and increased blood pressure and appeared to be addicted to it when unmasked with anesthesia the heart rate and blood pressure decreased rapidly

- patient taking ginseng with a history of coronary heart disease and hypertension had very labile blood pressure unresponsive to ephedrine
- ephedrine-type and catecholamine depletion-type reactions
- it was part of my differential diagnosis when determining the cause of decreased oxygen saturation which ended up being methemoglobinemia related to cetacaine spray
- in oriental patient who was not responsive to ephedrine to treat hypotension

One respondent who answered "no" to question four included the following comment:

- possibly bleeding problems and easy bruising in patient taking supplement with coumadin derivative